



(14)

## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification <sup>6</sup> :		(11) International Publication Number:	WO 97/12349
G09B 5/00, 23/18	A1	(43) International Publication Date:	3 April 1997 (03.04.97)

(21) International Application Number: PCT/GB96/02109

(22) International Filing Date: 30 August 1996 (30.08.96)

(30) Priority Data:  
9519698.6 27 September 1995 (27.09.95) GB

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(81) Designated States: AL, AM, AT, AU, AZ, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GE, HU, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, TJ, TM, TR, TT, UA, UG, US, UZ, VN, ARIPO patent (KE, LS, MW, SD, SZ, UG), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG).

## Published

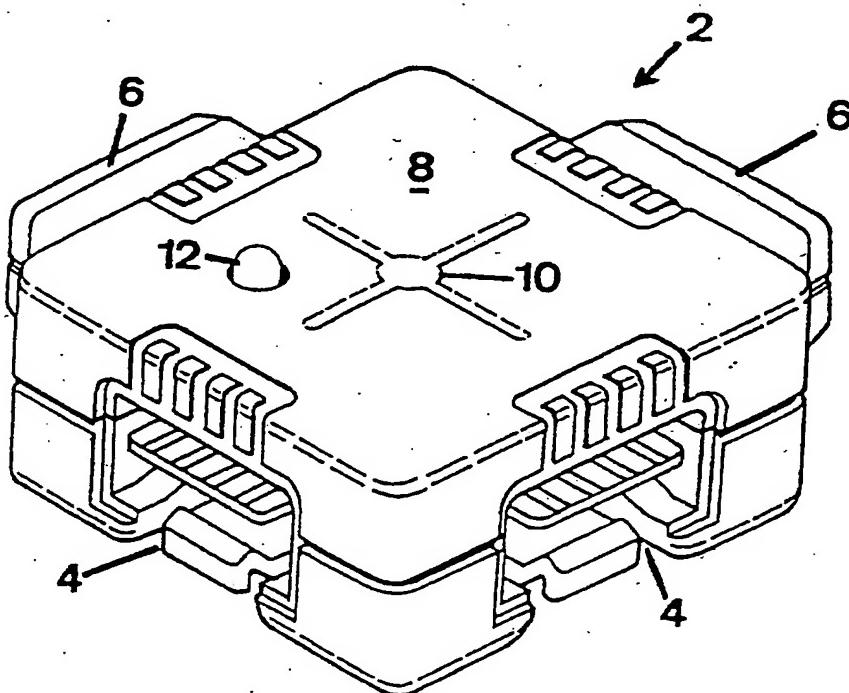
With international search report.

Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.

(54) Title: APPARATUS FOR USE AS AN EDUCATIONAL TOY

## (57) Abstract

Apparatus for use as an educational toy, which apparatus comprises a plurality of blocks (2), each block (2) being an electronic block (2) having at least one input (4) and/or at least one output (6), and the blocks (2) being interconnectable whereby different blocks (2) are able to perform different electronic functions and are able to be assembled in an order chosen by the user to convert at least one input signal into at least one predetermined output signal.



APPARATUS FOR USE AS AN EDUCATIONAL TOY

This invention relates to apparatus for use as an educational toy. The apparatus may help children develop logical skills.

The advent of home computers has seen children becoming adept at using computers. However, there is a tendency for the computers to be used solely for playing computer games, and most of these computer games do not help a child develop logical skills.

Additionally, research has highlighted possible dangers inherent in exposing children to computers and their visual display units at too early an age and for too long. Damage to eyesight can occur because the children's eyes are still developing and the children tend to stare at screens of the visual display units for long periods. These dangers are compounded by the fact that the visual display units purchased for the children tend to be cheap and of a low quality.

In addition to the above mentioned problems, there is a further problem in that children can become addicted to computer games. Children who become so addicted may become withdrawn and anti-social. The children may become ever demanding of more computer games, thereby placing a continual demand on parents

other types of contact members may be employed, for example strips or wires.

Each block may have at least one light device which lights up to indicate when the output signal is present. The light device is preferably a light emitting diode light device but other types of light device may be employed.

The apparatus may be one in which there is a plurality of the building blocks, and in which at least one of the building blocks acts as an interface with other devices in order to drive such devices or to be driven by such devices.

The building blocks may each have identifying means for identifying the function that will be performed by the building block. The identifier means may be a visual identifier means such for example as a coloured identifier means. Alternatively or in addition, the identifier means may be an audible identifier means.

The apparatus is preferably battery powered. In addition or as an alternative, the apparatus may be mains powered via a transformer.

The blocks may perform the functions of electronic AND gates, OR gates, one way delay elements, and signal inverters. If desired, the

tangible result from the way in which the blocks are assembled. The blocks may help children to develop logical thought patterns in order to solve problems and to achieve desired end results. The apparatus is able to be produced considerably cheaper than home computers, and the apparatus does not cause children to become addicted to it, or to damage their eyes.

Embodiments of the invention will now be described solely by way of example and with reference to the accompanying drawings in which:

Figures 1 and 2 show a first block;

Figures 3 and 4 show a second block;

Figures 5 and 6 show a third block;

Figures 7 and 8 show a fourth block;

Figures 9 and 10 show a fifth block;

Figures 11 and 12 show a sixth block;

Figure 13 shows a seventh block;

Figure 14 shows an eighth block;

Figure 15 shows a ninth block;

Figure 16 shows a tenth block;

Figure 17 shows an eleventh block;

Figure 18 shows a plurality of the blocks connected together;

Figure 19 shows how two blocks are connected together; and

straight connection between the single input 4 and the single output 6.

In Figures 5 and 6, the block 2 is rectangular in plan. The block 2 has two inputs 4 and one output 6. The top portion 8 has a symbol 16 indicating a logical OR gate.

The block 2 shown in Figures 7 and 8 is rectangular in plan and it has one input 4 and one output 6. The top portion has a symbol 18 indicating that the block 2 will function as an inverter.

In Figures 9 and 10 the block 2 is shaped as shown. It has one input 4 and two outputs 6. The symbol 20 indicates the direction of the signal from the input 4 to one or both of the outputs 6.

In Figures 11 and 12, the block 2 has one input 4 and one output 6. The symbol 22 indicates that the block 2 will perform a delay function.

Figure 13 shows a sequencer block 2 in the illustrated shape with one input 4, seven outputs 6, light emitting diodes 12, and symbols 24. The symbols 24 indicate the direction of connection around the block 2. The top portion 8 is provided with a design 26 intended to be attractive to a child.

Figure 14 shows a block 2 with one input 4. The top portion 8 is provided with sound generator means 28 from which an audible sound is emitted when a

electrical connection is effected by contact strips 36 shown in Figure 20. The contact strips 36 may alternatively be wires or pins. Inside each block 2 is a printed circuit board 38 containing appropriate components.

It is to be appreciated that the embodiments of the invention described above with reference to the accompanying drawings have been given by way of example only and that modifications may be effected. Thus, for example, the connection of the blocks together may be effected via appropriate contacts in the form of pins instead of contact strips. In addition to the symbols 10, 14, 16, 18, 20, 22, 24, the blocks may be provided with a background colour and/or an audible signature in order to identify the function of the blocks. If desired, the blocks may be produced in an outside shape which is the same as the electronic circuitry contained within the block, see for example block 2 of Figure 7 with the symbol 18 indicating the inverter function. If desired, another block (not shown) may provide a logical AND gate symbol and function.

The building blocks may contain a variety of electronic components in addition to the light emitting diodes 12. Other types of light than light emitting diodes 12 may be employed if desired. The

blocks flash on and off continuously and automatically.

The blocks are modular so that children can add or subtract blocks from the apparatus of the invention, and observe the results without disconnecting the power source. The blocks are interconnectable such that they are safe to disconnect without first disconnecting the power source. The blocks 2 cannot be connected incorrectly or upside down so as to form a short circuit or malfunction. Certain combinations of blocks will be found by the children to have certain specific functions. These combinations can be retained for future use. Such an approach mirrors computer programming and gives an introduction to the concepts of higher level programming.

Where the blocks are to be used with an external output, then the blocks may be arranged to operate, for example, a lighthouse or a lift. The lift may be a cardboard or plastics structure having a motor which drives the lift automatically, the lift being powered by a battery in the lift structure. It may then be the task of a child to assemble the blocks in such a way as to control the lift. Such an exercise teaches the use of the blocks as a motor control. When the blocks are used with a lighthouse, then the blocks may

light dependent resistors, radio modules, counters, bi-metallic strip sensors, infra-red light emitting diodes and receivers, microphones, wind sensors, moisture probes, electronic dice, electronic scales, and photo electric cells.

The apparatus is advantageous in that it is able to teach children to develop logical skills in an entertaining way. The apparatus is however able to be produced at low cost and at a cost which is much cheaper than the cost of a home computer. In addition, the dangers of addiction to computer games are avoided.

If desired, the blocks may be of different shapes to those shown, and they may have different combinations of inputs and outputs. The blocks may be produced in any suitable and desired sizes. Preferably, the blocks are produced to be easily portable.

6. Apparatus according to any one of the preceding claims in which there is a plurality of the blocks, and in which at least one of the blocks acts as an interface with other devices in order to drive such devices or to be driven by such devices.
7. Apparatus according to any one of the preceding claims in which the blocks each have identifier means for indicating the function that will be performed by the building block.
8. Apparatus according to claim 7 in which the identifier means is a visual identifier means.
9. Apparatus according to claim 7 or claim 8 in which the identifier means is an audible identifier means.
10. Apparatus according to any one of the preceding claims and which is battery powered.

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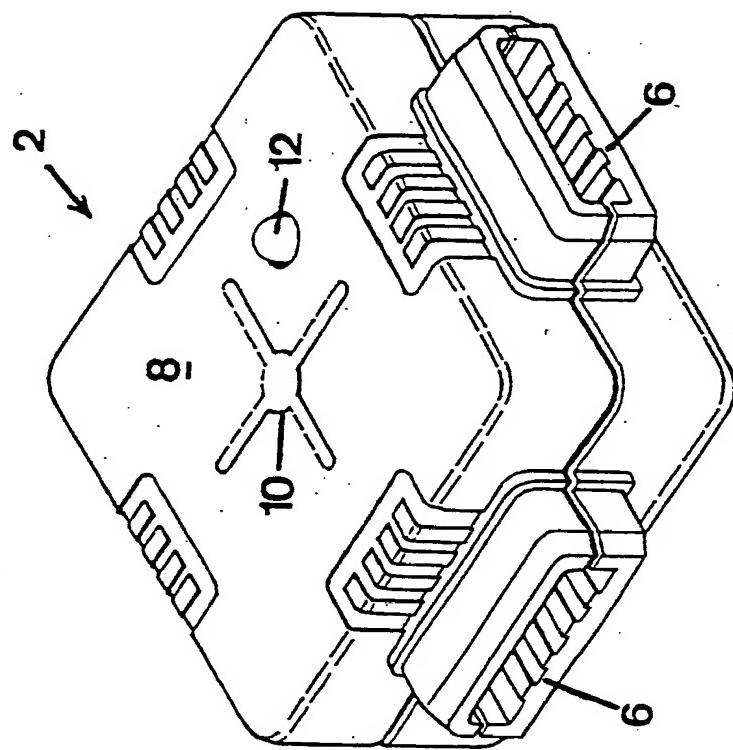


FIG 2

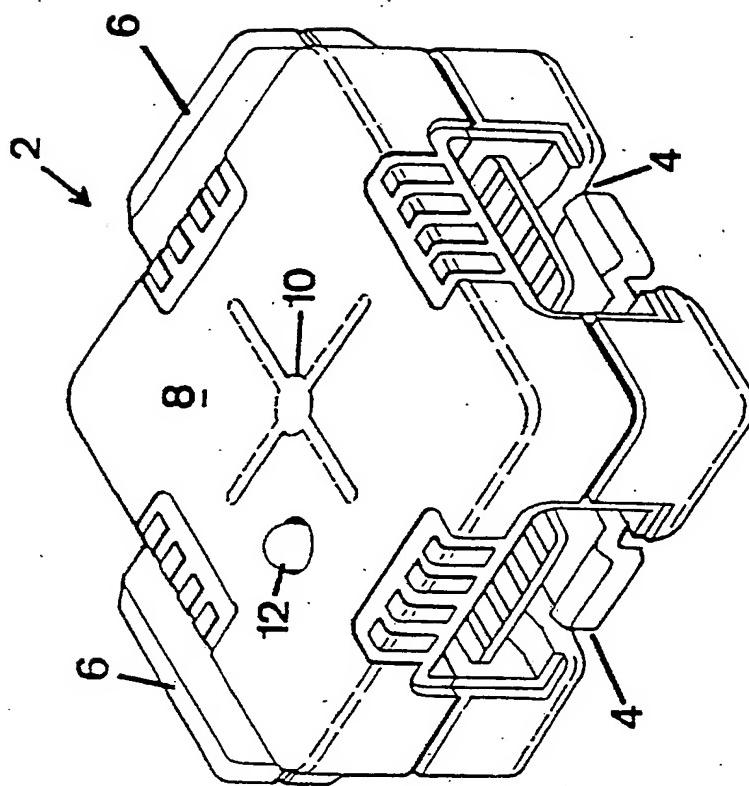


FIG 1

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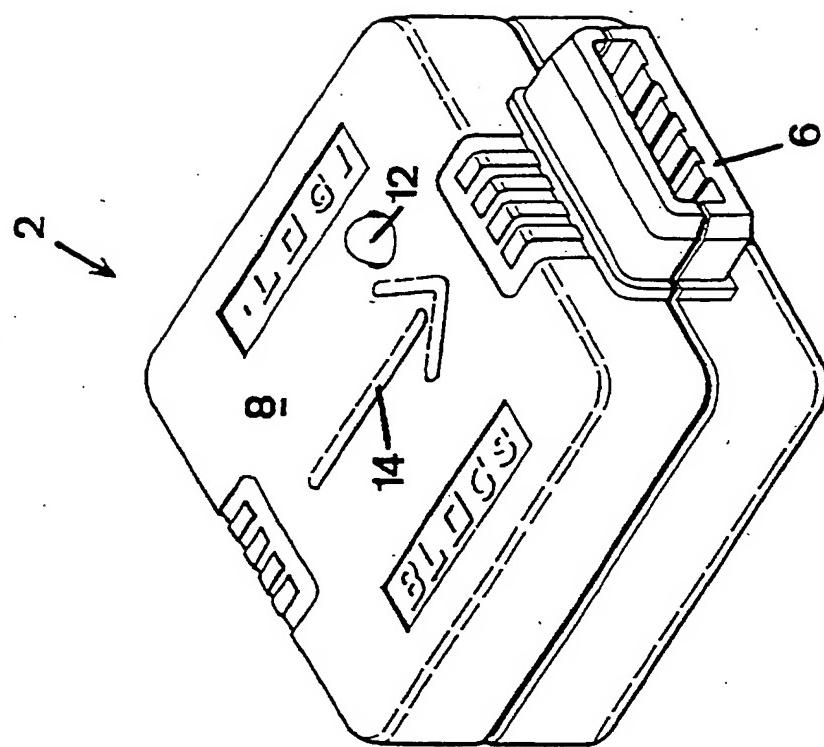


FIG 4

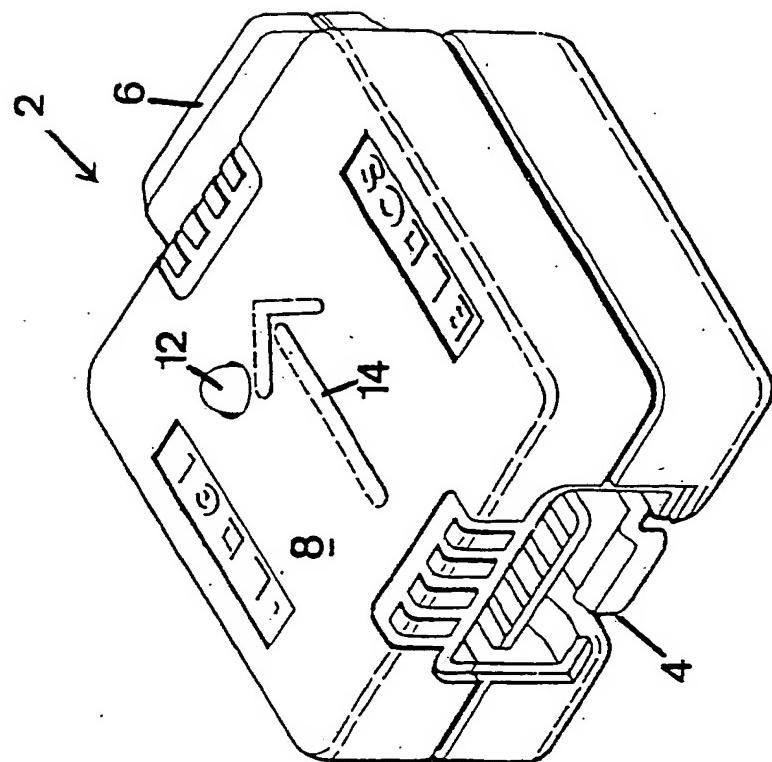
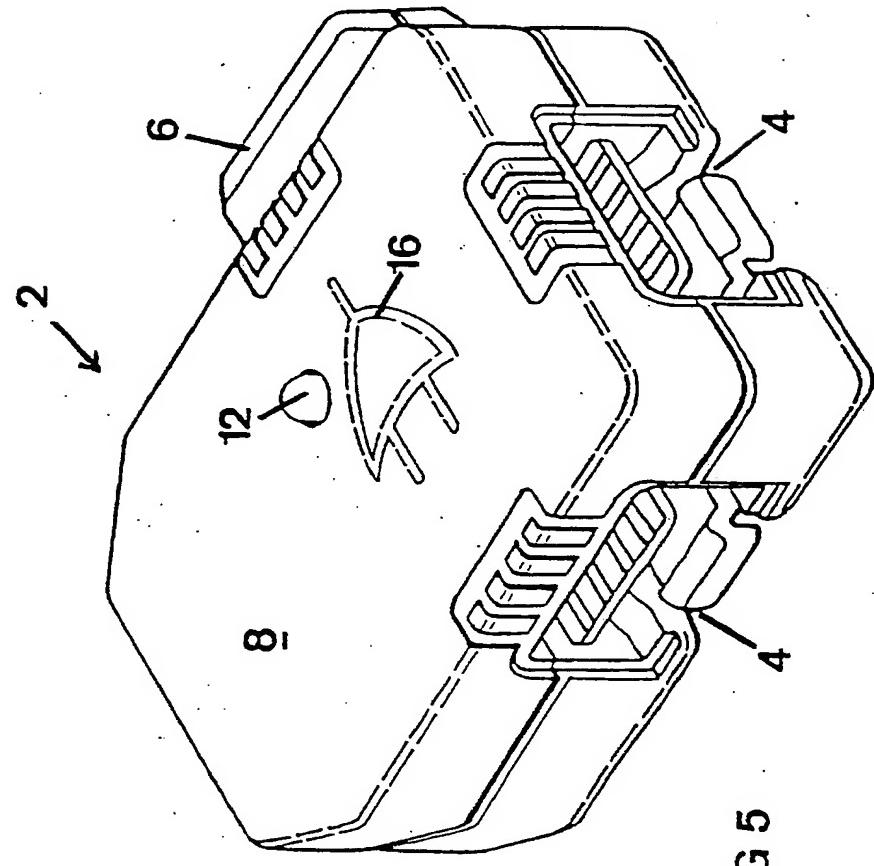
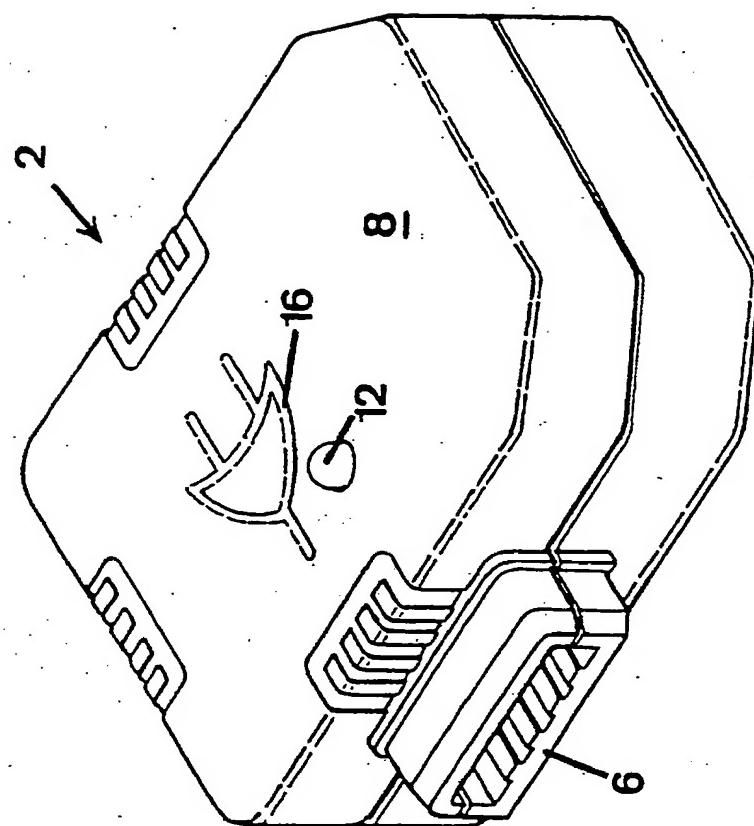


FIG 3

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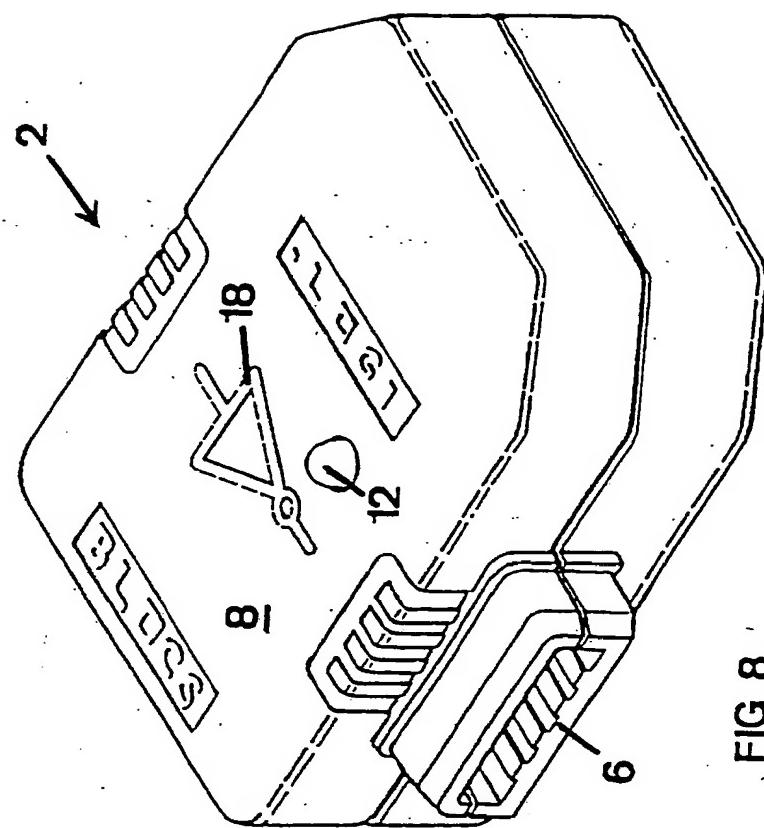


FIG 8

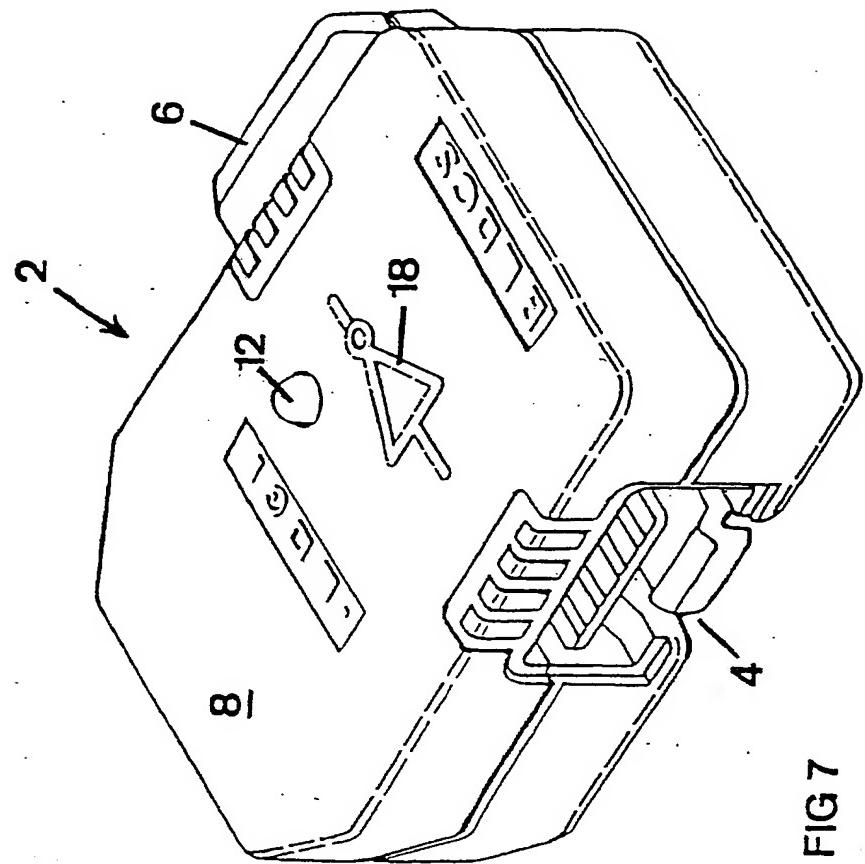


FIG 7

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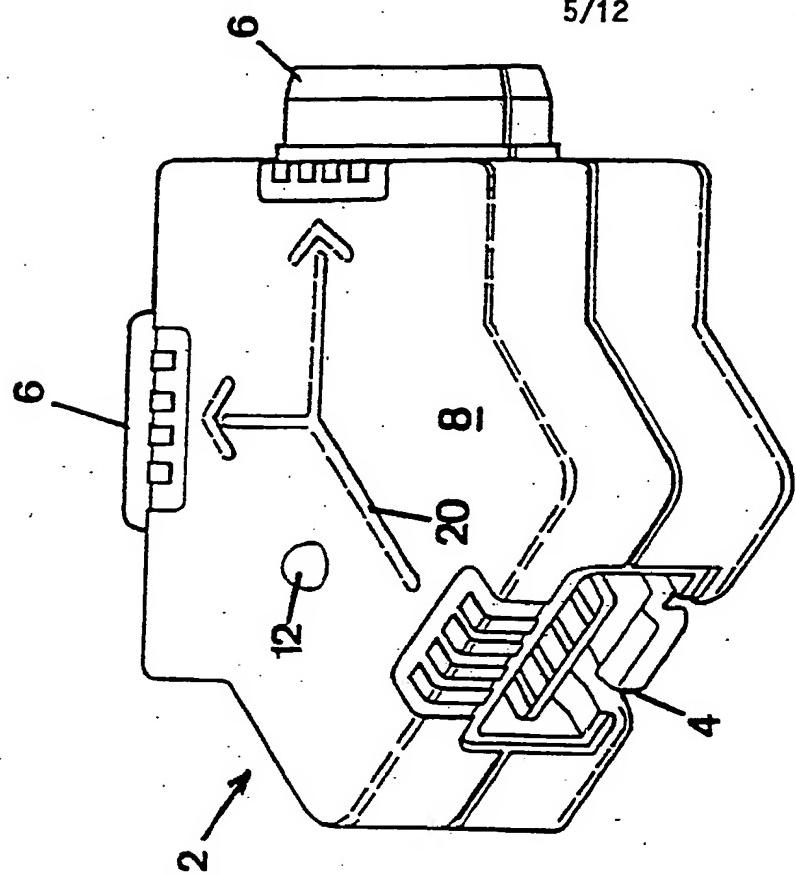


FIG 10

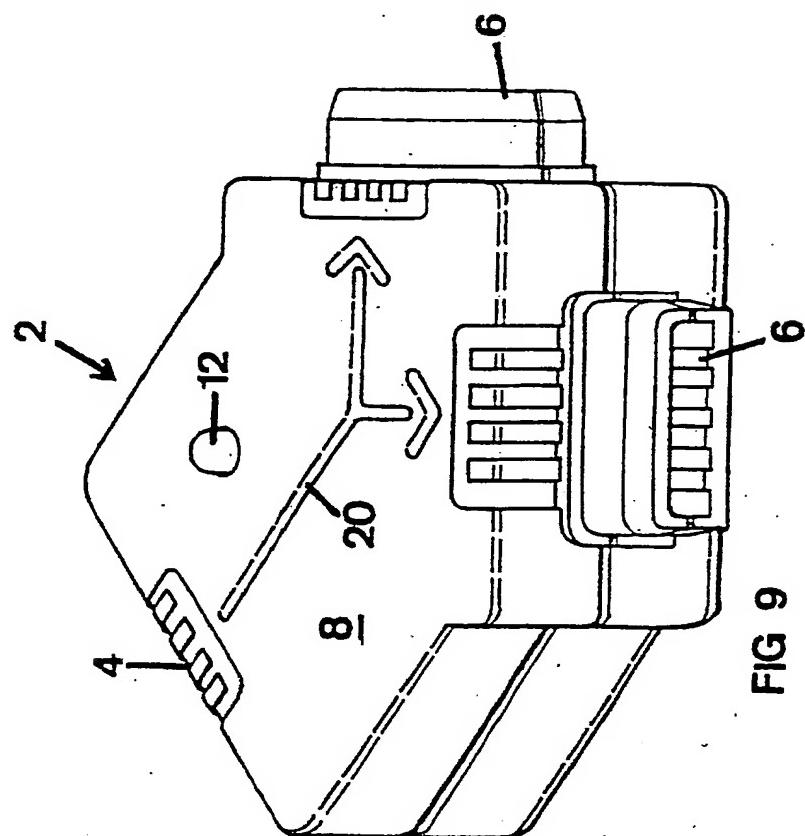


FIG 9

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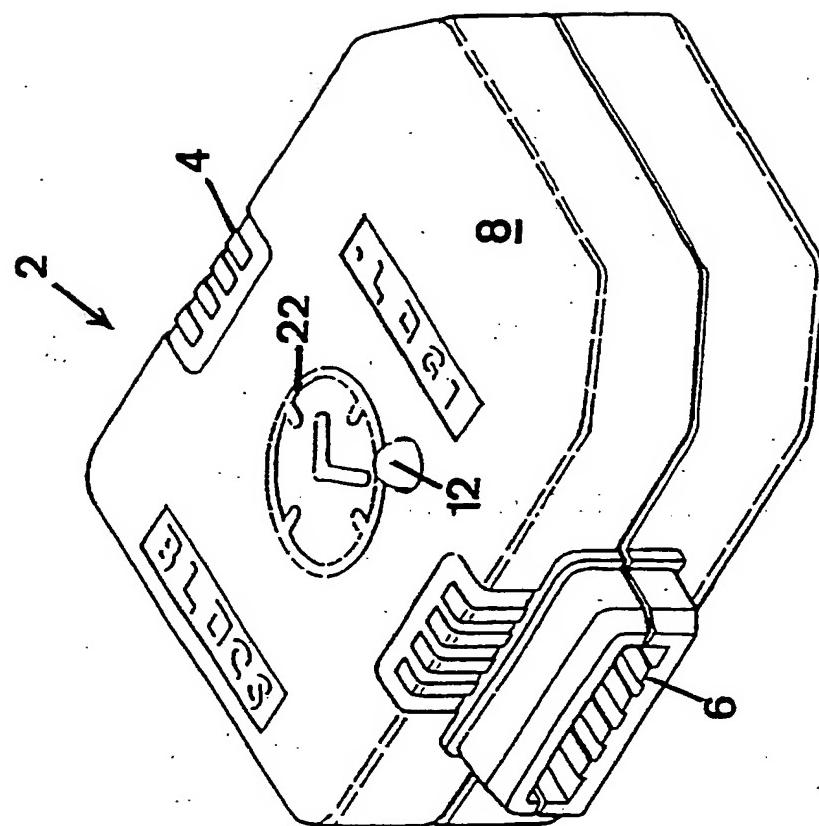


FIG 12

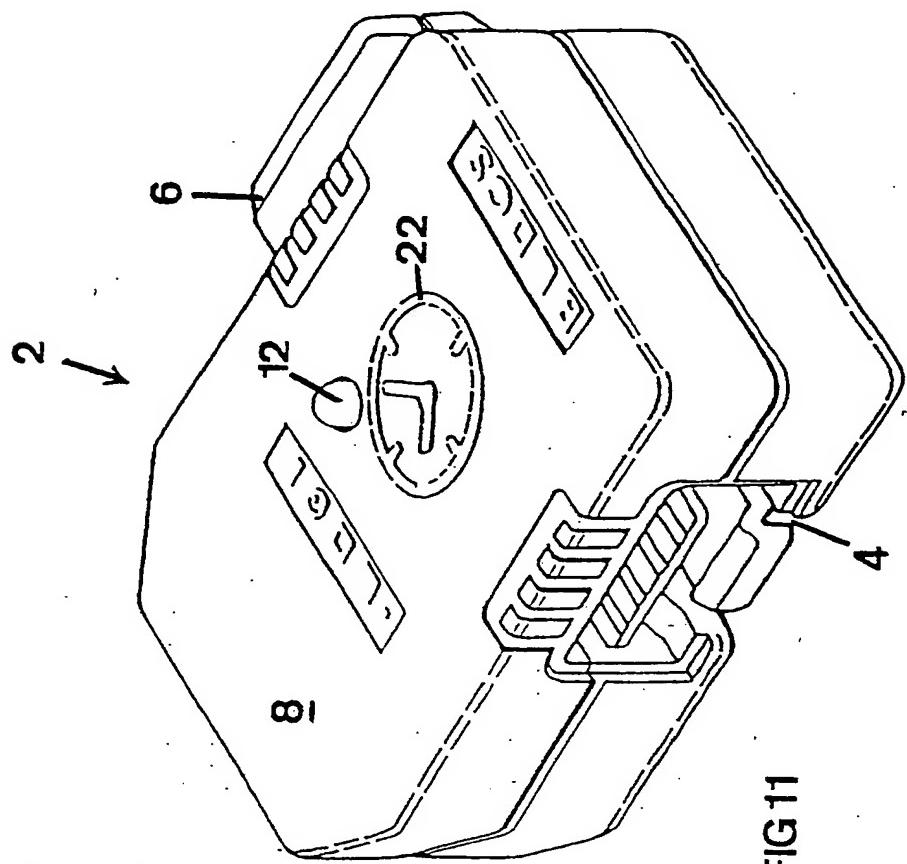
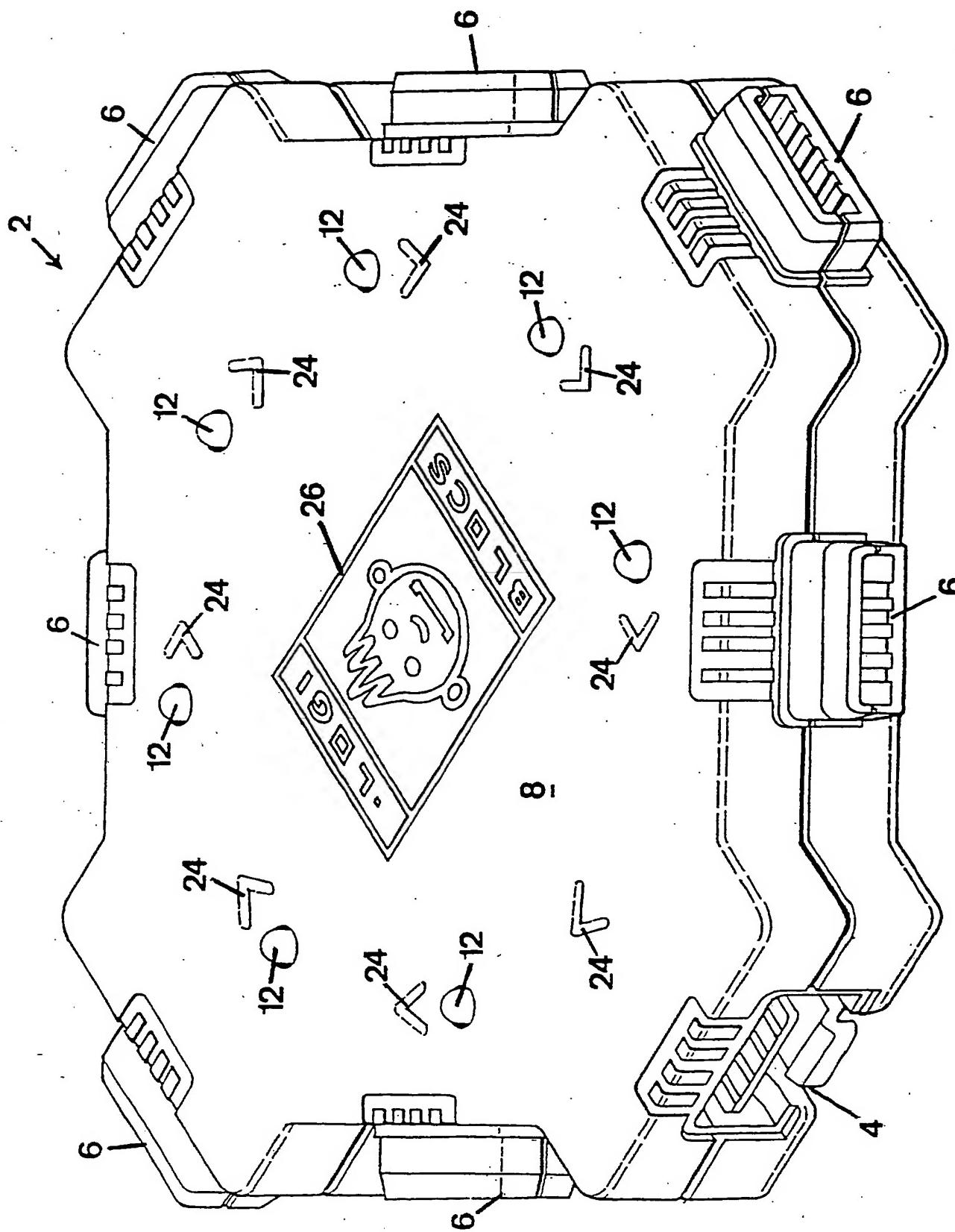


FIG 11

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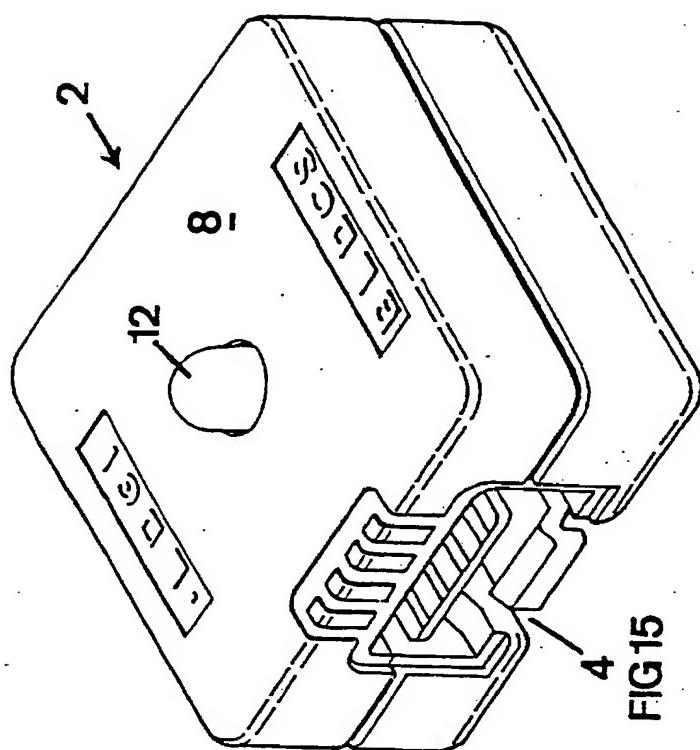


FIG 15

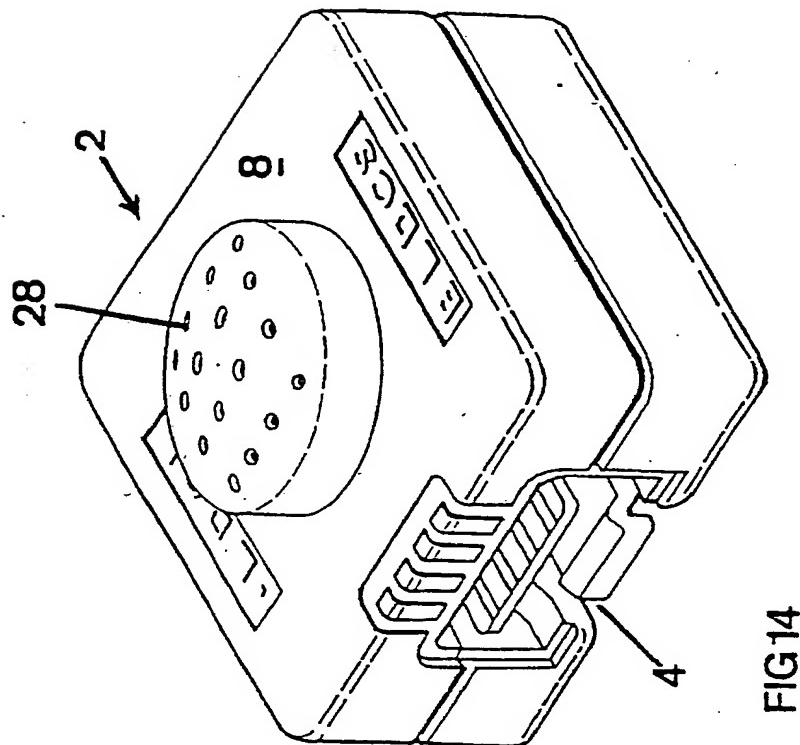


FIG 14

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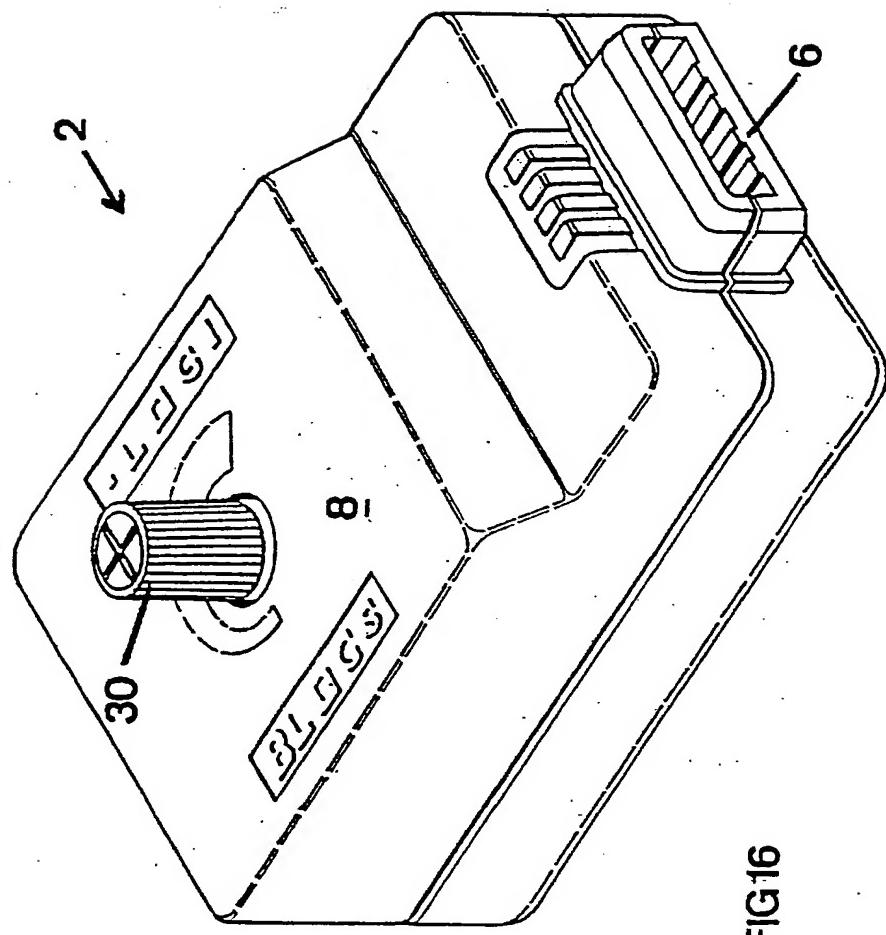


FIG 16

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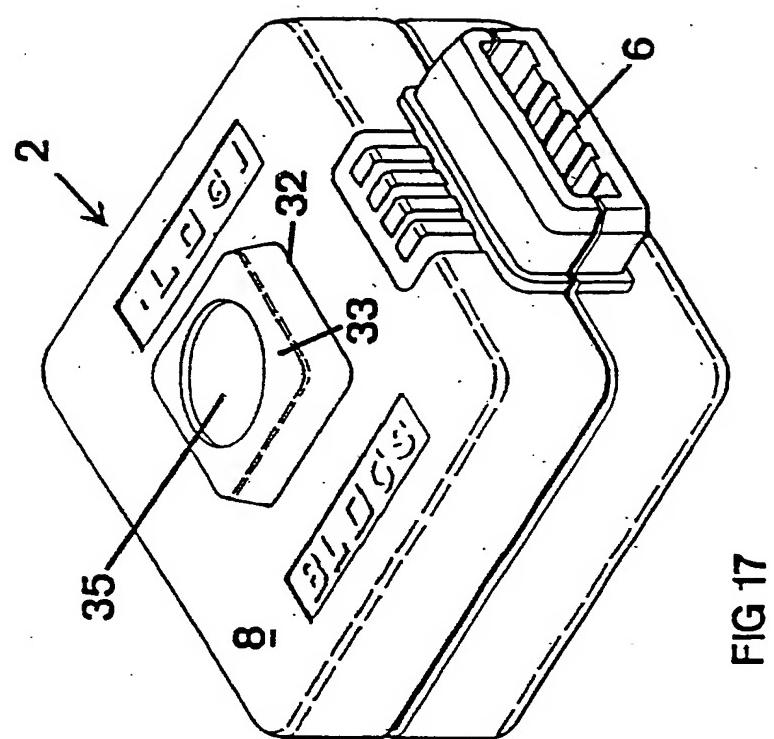


FIG 17

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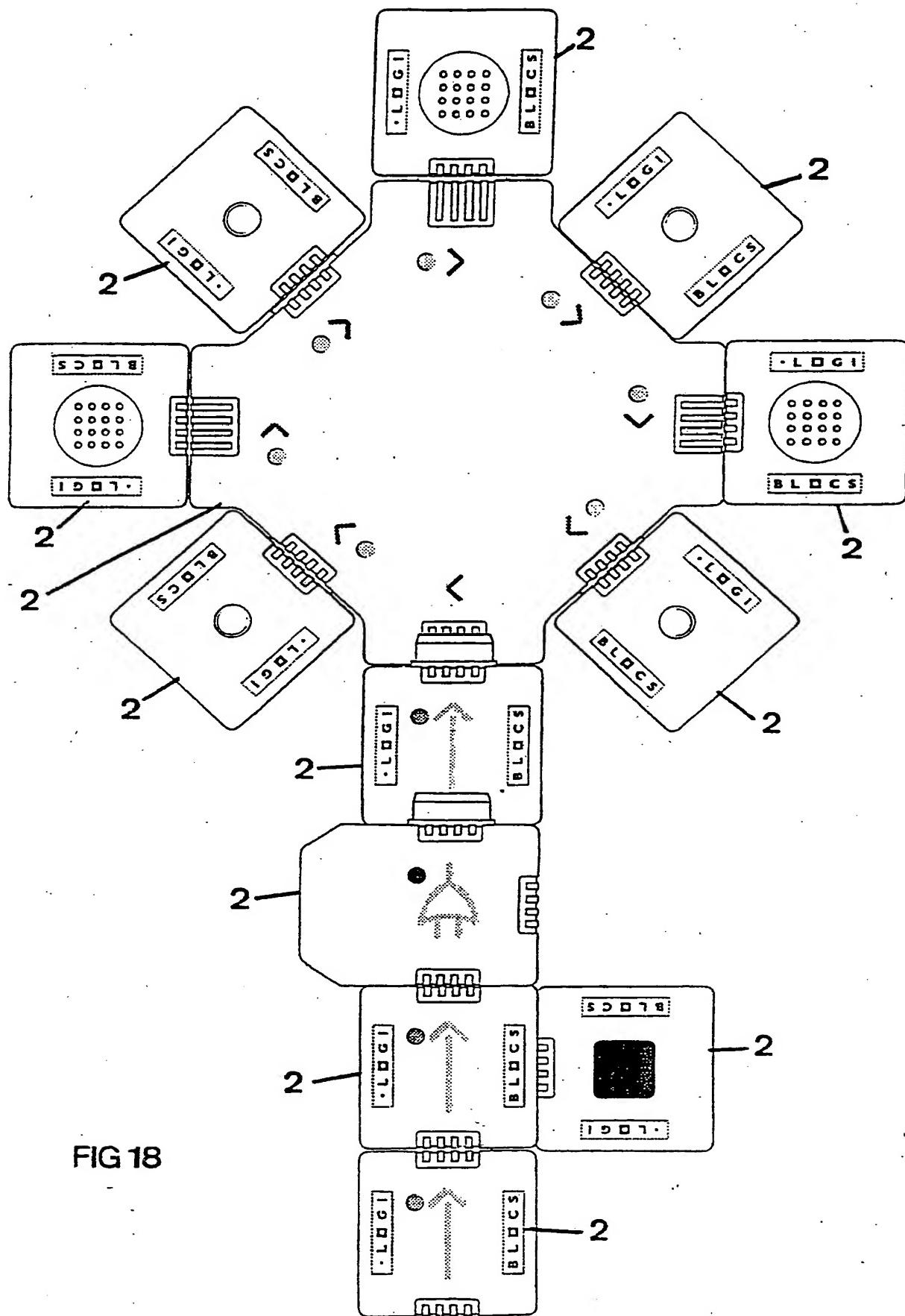


FIG 18

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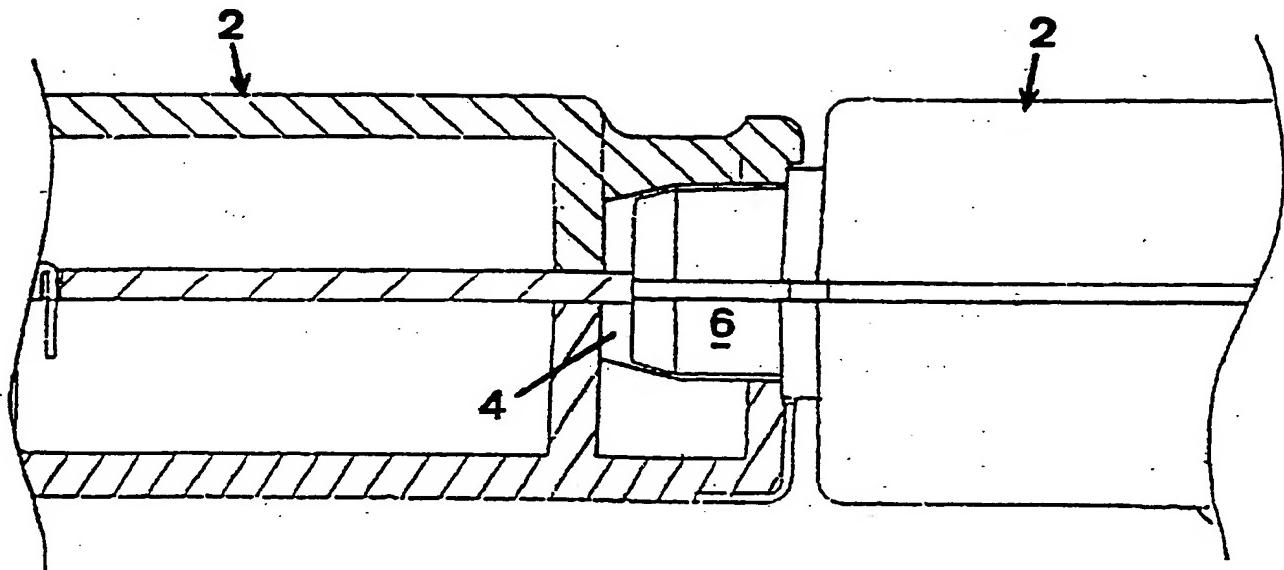


FIG 19

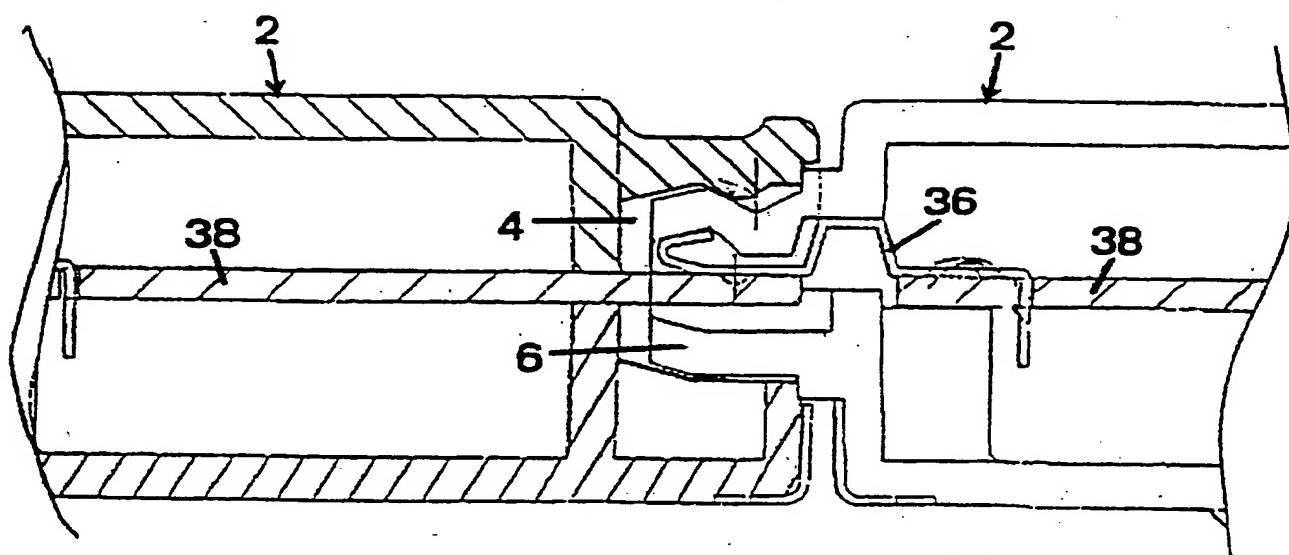


FIG 20

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## INTERNATIONAL SEARCH REPORT

International Application No  
PCT/GB 96/02109

A. CLASSIFICATION OF SUBJECT MATTER  
IPC 6 G09B5/00 G09B23/18

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)  
IPC 6 G09B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 4 969 827 A (HAHS JR CHARLES A) 13 November 1990 see column 2, line 30 - column 5, line 13; claims 1,3-7; figures 1-4 ---	1,2
X	EP 0 135 633 A (WENG TENG CHING ;YANG CHI MING (TW)) 3 April 1985 see the whole document ---	1,2
X	US 3 594 689 A (HOPT RUDOLF ET AL) 20 July 1971 see the whole document ---	1,2,7,8
A	US 4 449 942 A (SALIT YECHIEL) 22 May 1984 see the whole document ---	1-3,7,8, 10 -/-

Further documents are listed in the continuation of box C.

Patent family members are listed in annex.

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Date of the actual completion of the international search  28 February 1997	Date of mailing of the international search report  12.03.97
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## INTERNATIONAL SEARCH REPORT

In relation on patent family members

International Application No

PCT/GB 96/02109

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